JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1989, 22, 315–323 NUMBER 3 (FALL 1989)

SELF-RECORDING OF ATTENTION VERSUS PRODUCTIVITY

JOHN WILLS LLOYD, DAVID F. BATEMAN,
TIMOTHY J. LANDRUM, AND DANIEL P. HALLAHAN

UNIVERSITY OF VIRGINIA

We investigated the relative effects of self-recording of attentive behavior and self-recording of academic productivity with 5 upper elementary-aged special education students in their special education classroom. Following baseline, both self-recording treatments were introduced according to a multielement design. After the multielement phase, we assessed the pupils' performance under a choice condition, faded the overt aspects of the treatment program according to a withdrawal design, and probed maintenance over 5 weeks. Results revealed that both treatments produced clear improvements in arithmetic productivity and attention to task, neither treatment was clearly and consistently superior to the other, pupils preferred the self-recording of attention treatment, the effects were maintained for all pupils, achievement test scores improved, and pupils generally recorded accurately.

DESCRIPTORS: academic behavior, alternating treatments, attending behavior, children, classroom behavior, on-task behavior, self-monitoring, self-recording

The therapeutic value of the reactive effects of self-recording has been clearly established with diverse behaviors and individuals (for reviews, see Gardner & Cole, 1988; Kazdin, 1974; Mace & Kratochwill, 1988; Nelson, 1977). In school situations, many studies have shown that self-recording promotes attention to task. However, in their examinations of this literature, Klein (1979) and Snider (1987) suggested that academic performance, rather than attending, would be a more appropriate target for self-recording.

Two studies compared self-recording treatments focused on academic performance and attention to task. Rooney, Polloway, and Hallahan (1985) taught students two self-recording procedures. One procedure required that each time the pupils heard a brief tone from a tape recorder they stop, ask themselves whether they were paying attention, and then record their "yes" or "no" answer on a prepared answer sheet. The second procedure required that each time the pupils completed a specially marked problem on their worksheets they compare their answer for the marked problem to the answer on an answer sheet and record whether they had answered correctly. Rooney et al. did not find clear differences between effects of these procedures.

In another comparison, Harris (1986) used a reversal design with elementary-aged students. She used essentially the same procedure for self-recording of attention as did Rooney et al. (1985) and compared it to a self-recording-of-productivity procedure in which the pupils were taught to make an overall judgment of performance (count number of spelling words practiced) at the end of each class period. She also reported no differences between treatments, but the pupils preferred the productivity treatment. However, to correct for order effects inherent in the use of the reversal design, she counterbalanced the order in which pupils received the two treatments (i.e., ABCBC versus ACBCB). This essentially created a between-groups design with 2 subjects in each cell and, thus, complicated interpretation of the results.

In addition to the design difference, the self-recording procedures that Rooney et al. (1985) and

We appreciate the help of Eve O'Brien and Chris Swann on this study and the cooperation of the Waynesboro Public Schools, particularly Berkeley Glenn Elementary School, and Rodney Bradt. This study was supported in part by Grant G0087C3033 to the University of Virginia from the U.S. Department of Education Office of Special Education Programs; however, opinions expressed here do not necessarily represent the position of the funding agency. David Bateman is now at Northern Illinois University.

Address correspondence to John Wills Lloyd, Curry School of Education, University of Virginia, Charlottesville, Virginia 22903-2495 (or via BITNet: JOHNL@VIRGINIA).

Table 1
Characteristics of Participating Students

Subject	Age	Sex	Handicapping condition[a]	WISC-R Verbal	WISC-R Performance	WISC-R Full	Math achievement[b]
Brenda	10-0	F	SED	97	85	91	8
Carrie	10-9	F	SED/LD	107	81	95	12
Terry	11-2	M	LD	81	103	101	9
Rich	11-6	M	SED/LD	103	87	97	4
Tommy	10-11	M	LD	101	89	96	7

[a] SED, seriously emotionally disturbed; LD, learning disabled.
[b] Percentile.

Harris (1986) compared differed from each other in other ways. For example, Rooney et al. (1985) compared self-recording of a broad behavior (attending) with a specific behavior (accurate answers on certain tasks), and Harris compared momentary judgments of attending with overall judgments of productivity. Also, although Harris (1986) assessed pupil preference for treatments, neither study comprehensively evaluated the effects of the procedures by assessing other factors (e.g., self-recording accuracy, percentage of correct responding, or standardized achievement). The purpose of this study was to examine self-recording of attention and productivity with a multielement design, to use more highly comparable self-recording procedures, and to include measures that permit consideration of a wide range of effects.

METHOD

Subjects and Setting

Subjects. Five students in an elementary special education classroom participated in the study. Each had been identified according to school district guidelines as seriously emotionally disturbed (SED), learning disabled (LD), or both SED and LD. Identifications were based on the criteria used in the federal government's definitions of LD and SED (see Cullinan, Epstein, & Lloyd, 1983; Hallahan, Kauffman, & Lloyd, 1985). We selected these 5 students because their teacher said that, during independent work periods, they did not complete assignments and looked around the room instead of working. Prebaseline observations of attention to task indicated that the pupils were attending to assigned tasks from 20% to 55% of time during independent work periods; achievement testing revealed low percentile scores. The teacher obtained parental permission for participation in the study prior to the collection of baseline data. Characteristics of the pupils are shown in Table 1.

Setting. The teacher conducted experimental sessions during regularly scheduled 60-min periods in the pupils' resource classroom. During this time several other students who were not participating in the study entered or left the classroom as their assignments changed. The classroom was approximately 5 m by 6 m and had three rows of two desks at which the participating pupils sat during the experimental sessions.

Observation Systems, Target Behaviors, and Reliability Assessment

Observers collected direct observation data in the classroom. The observers, who were not informed about the purposes and plan of the study, assessed the pupils' performance according to a 3-s momentary time-sampling procedure that rotated across subjects sequentially (Thomson, Holmberg, & Baer, 1974). The observer sampled 1 pupil's behavior at the first 3-s interval, then sampled a 2nd pupil's behavior at the next 3-s interval, and so on, until each of the 5 pupils had been observed; then, after a 3-s break, the observer repeated the cycle. Thus, each pupil was observed once every 18 s throughout an experimental session. The observers were given videotape training and training in the classroom until they reached a level of at least 75% interrater weighted agreement (Harris & Lahey, 1978).

At each time-sample interval the observer recorded codes for the pupil's behavior and for teacher–pupil interaction. The pupil behavior codes included (a) what the pupil was doing with his or her hands (manipulating a writing instrument, holding other objects, raising his or her hand, counting fingers, or using his or her hands in some other activity) and (b) at what the student's eyes were directed (assigned work, the teacher, peers, or nonacademic objects or simply looking around). A student was judged to be attending to task when he or she was looking at his or her assigned work and holding his or her pencil in a writing or erasing position. The teacher–pupil interaction codes included (a) positive interaction (e.g., teacher was within 1 m of the subject and performed actions such as making positive comments, placing his hand on a student's shoulder, etc.), (b) negative interaction (e.g., teacher admonished, chastised, or restrained student), or (c) no interaction.

We assessed academic productivity by monitoring the pupils' rate of correct performance on prepared worksheets drawn from the *Computational Arithmetic Program* (*CAP*; Smith & Lovitt, 1982). The *CAP* is a sequence of arithmetic practice pages that increases in difficulty. The teacher placed students in the program and advanced them to more difficult levels of work according to guidelines (based on rate and percentage of correct responding) provided with the program. The unit of measurement for productivity was a movement. A movement is a numeral written in the answer space to a problem or in deriving the answer to a problem; the answer to the problem $3 + 4$ has one movement but the answer to the problem $13 + 4$ has two movements. Movements provide a consistent measure of performance across problems of differing levels of difficulty. The teacher recorded the duration of each session, allowing us to convert the number of correct movements into rate data.

To assess academic achievement (as opposed to productivity and accuracy), an experimenter administered the arithmetic subtest of the *Woodcock–Johnson Psycho-Educational Battery* (Woodcock & Johnson, 1977). We determined each pupil's achievement (in percentile rank) prior to baseline and during the maintenance phase.

We conducted observer agreement checks on 10 (21%) of the observation sessions and calculated agreements by the weighted agreement procedure recommended by Harris and Lahey (1978). The mean weighted agreements for on-task were 75% (range, 65% to 85%), 84% (range, 80% to 91%), and 91% (range, 90% to 93%) during the baseline, self-recording, and maintenance phases, respectively. The mean weighted agreements for teacher interaction were 96% (range, 95% to 98%), 95% (range, 94% to 96%), and 95% (range, 93% to 98%) for baseline, self-recording, and maintenance phases, respectively. The mean point-by-point agreement for the permanent product measures was 99% (range, 97% to 100%).

Experimental Procedures and Design

We observed participants under baseline, self-recording, and maintenance conditions; the self-recording condition was subdivided into three phases: alternating treatments, choice, and fade. For Brenda, Carrie, and Terry, the change from baseline to self-recording was made according to the time-lagged procedures required by a multiple baseline (across subjects) design; so that they could enter the treatment conditions as soon as possible, we began the interventions for Rich and Tommy on the same day as for Terry. We instituted other phase changes across all 5 students at the same time; our decisions about phase changes were based on sustained high levels of performance. Within the first self-recording phase, we compared the two active treatments (self-recording of productivity and self-recording of attention) using a multielement design.

Each class session was divided into three segments. During the first and third segments of approximately 15 min each, the pupils worked independently on arithmetic practice pages and recorded either their attention to task or productivity. At the beginning of each segment the teacher told the pupils to complete as many problems correctly as they could during the allotted time. During the second segment the students and teacher did not use any self-recording procedures; they worked on other activities (e.g., group spelling instruction) for approximately 20 to 30 min.

We took three steps to decrease the chances of multiple treatment interference. First, the interpolated activity between self-recording sessions was used because longer intercomponent intervals decrease multiple treatment interference (McGonigle, Rohan, Dixon, & Strain, 1987). Second, we systematically associated discriminative stimuli (color coding of worksheets and other paper used by the pupils) with conditions to make the discrimination between conditions clearer to the participants. Third, we associated tones of different pitch with each condition as signals for the students to record their behavior.

Baseline. One feature of the treatments (tape-recorded tones) was instituted during baseline to rule out the alternative explanation that these sounds increase pupil performance even in the absence of the pupils knowing that the sounds are prompts to assess and record their own behavior (see Hughes & Hendrickson, 1987). The tones occurred at irregular intervals (mean intertone interval 45 s, range, 10 to 90 s). To prevent habituation to a sequence of intertone intervals, the teacher started the tape at different places on the tape each day. However, the frequency of the tape-recorded cues was kept constant by having the teacher start the tape at roughly the same place for the two different conditions on a particular day.

Self-recording. During the self-recording phase, the teacher required the pupils to record their own productivity or attention to task, depending on the treatment condition in effect. During the first 15-min segment of the arithmetic period each day, students were engaged in one of the two active treatment conditions; during the third segment of the period they were engaged in the other treatment condition. We randomly determined the order in which the treatments occurred each day with the restriction that neither condition could occur first more than 3 days within any 1 calendar week. No other programmed contingencies were in effect during these periods.

Treatment training sessions lasted approximately 30 min and were instituted immediately prior to the 1st day of the alternating treatments phase for each student. The teacher conducted brief (approximately 5 min) retraining sessions (boosters) after extended absences or holidays.

The procedures for self-recording of attention to task closely followed those reported elsewhere (e.g., Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979). During the initial phase of training, we taught the pupils to discriminate between attending and nonattending behavior. We then taught them to ask themselves, whenever a tape-recorded tone occurred, whether they were paying attention to their assignments and to record their judgments on prepared recording sheets. During the training session for this treatment, there was no emphasis on the amount of work the pupils completed.

The procedure for self-recording of productivity closely paralleled the attention-monitoring procedure. However, instead of asking themselves whether they were attending at the time of the tone, the students were taught to ask themselves how much work they had completed. To make this judgment, at the tone they marked the problem on which they were working, counted how many problems they had completed since the previous cue, and recorded this number on prepared recording sheets. During the training session for this condition, there was no emphasis on pupils imitating on-task behavior or on the accuracy of their answers.

Choice. Following the multielement phase, an experimenter interviewed the pupils individually about their opinions regarding the treatment conditions. He asked about their preferences for the different treatments (e.g., "If you had to choose whether you wanted to use [self-recording of attention] or [self-recording of productivity], which would you pick?"). Because all 5 pupils preferred self-recording of attention, it was put into effect for eight observation sessions.

Fade. The self-recording procedure was withdrawn according to a sequential withdrawal design (Rusch & Kazdin, 1981). The teacher first told the pupils that they would no longer hear the tape-recorded cues to assess and record their behavior but that they should still record whether they were paying attention whenever they thought about it. After 3 more days, the teacher told them they would no longer be required to record their judgments about their behavior.

Maintenance. After fading the overt aspects of the treatment procedure, we decreased the frequency of arithmetic practice sessions and observations. This condition was implemented to assess the durability of treatment effects in the absence of manifest treatment procedures. Data were collected on 8 days over 5 weeks.

RESULTS AND DISCUSSION

Clear and salutary changes in productivity occurred for each student when the self-recording procedures were introduced (see Figure 1). Although neither procedure produced clearly superior levels of performance across all pupils, there was a trend toward better performance under self-recording of attention; this procedure resulted in higher levels of performance on 38%, 95% 21%, 100%, and 92% of the days for Brenda, Carrie, Terry, Rich, and Tommy, respectively. During the choice phase (attention to task), performance continued at high levels. As the procedure was withdrawn and during the maintenance probes, performance levels remained high.

As shown in Figure 2, attention to task also increased substantially for all subjects when the self-recording procedures were instituted. Although the direct comparison between the attention and productivity treatments did not show clear differences, there was a trend in favor of self-recording of attention on 57%, 77%, 77%, 71%, and 55% of the observation days for Brenda, Carrie, Terry, Rich, and Tommy, respectively. Again, when the students chose to work under the attention condition, attending behavior continued at high levels. These levels were maintained across the withdrawal and maintenance conditions.

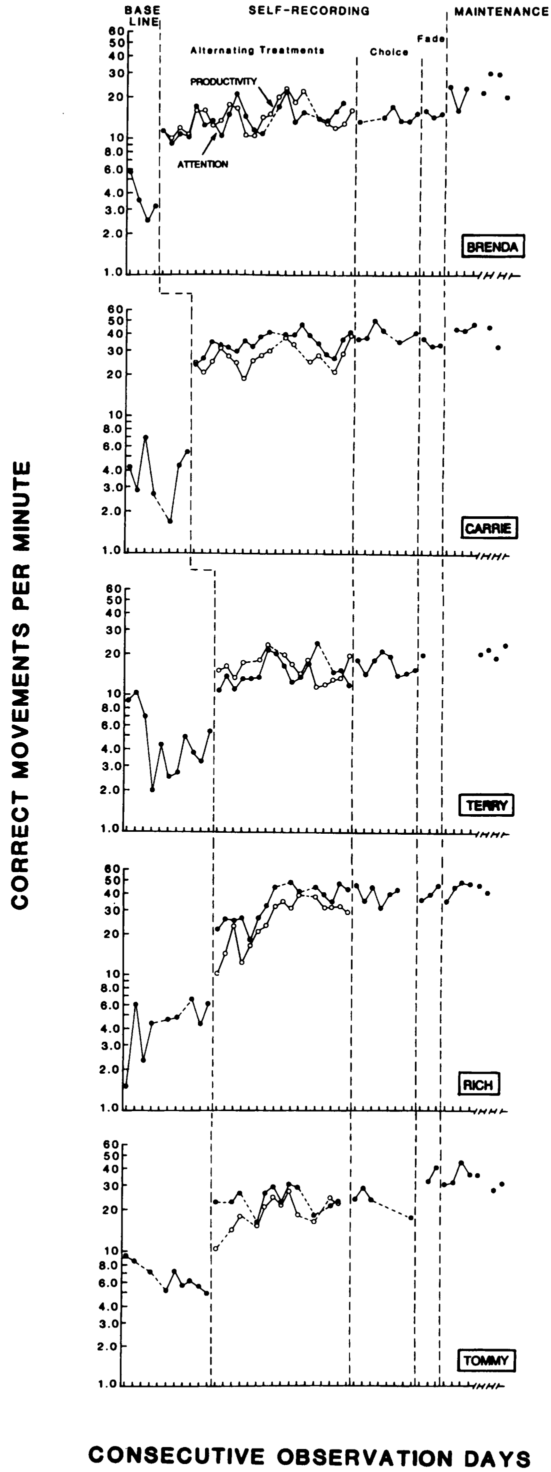

Figure 1. Rate of correct movements across experimental conditions. Stippled lines between data points indicate that no data were collected under that condition for that student for that day.

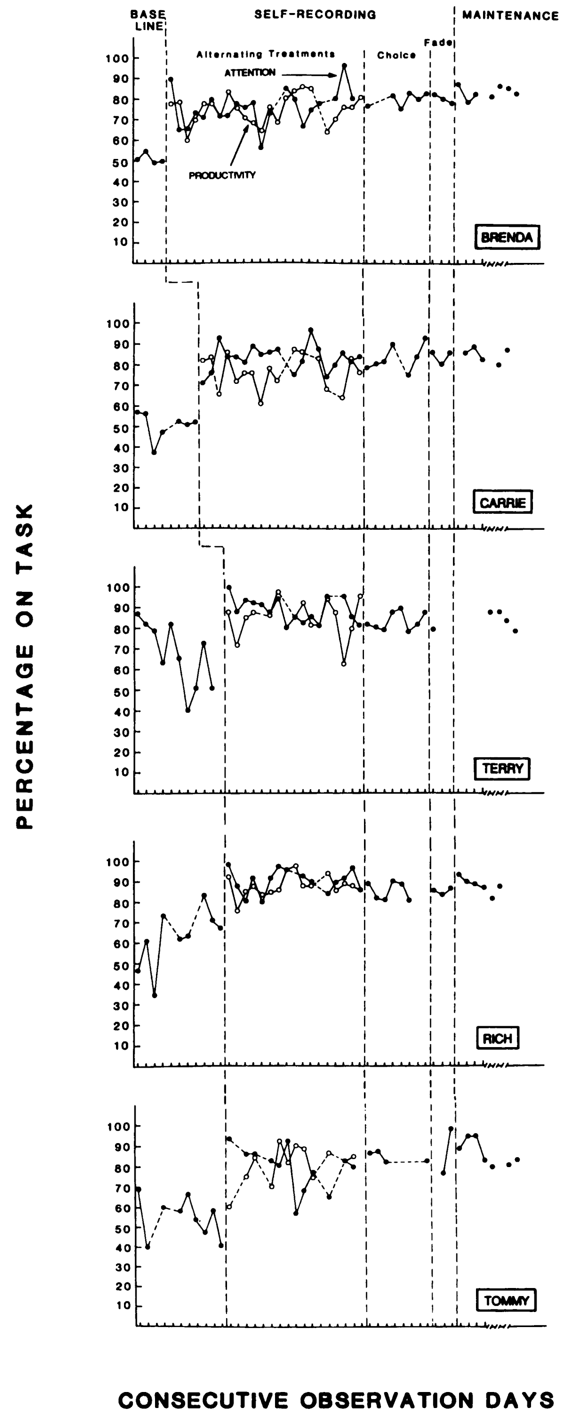

Figure 2. Percentage of time attending to task across experimental conditions. Stippled lines between data points indicate that no data were collected under that condition for that student for that day.

The introduction of the two active treatment conditions also resulted in substantial increases in the accuracy of pupils' arithmetic answers, but the two treatments' effects did not differ (see Table 2). We observed continued high levels of performance under the choice condition (with the exception of Rich) and the withdrawal and follow-up conditions. It is also noteworthy that the variability in the students' performance was substantially reduced when we introduced the intervention procedures.

These results replicate and extend the results of previous research on the use of self-recording with students in school situations (cf. Gardner & Cole, 1988; Mace & Kratochwill, 1988). Taken together, the results of this and previous studies indicate that self-recording is a powerful intervention technique that can be used successfully by teachers and students in school settings.

However, the findings of the comparison of attention and productivity monitoring are not as clear. Although our data indicate that the two treatments are not equally effective, the differences are not consistent enough to warrant favoring one intervention over the other. Similarly, neither Harris (1986) nor Rooney et al. (1985) reported differences between the two procedures. However, it may be that the two procedures are differentially effective, but that differences would emerge only when a randomized, group-contrast design is used to assess them. Were they to emerge, such differences would probably be quite small and therefore would probably have few implications for the application of self-recording.

Standardized pretests and posttests of arithmetic computational skill revealed that the students made substantial progress in comparison to the norm group for the Woodcock–Johnson battery. Pretest percentile ranks were 8, 12, 9, 4, and 7 and posttest ranks were 15, 20, 20, 6, and 16 for Brenda, Carrie, Terry, Rich, and Tommy, respectively. Although other investigators (Hallahan, Lloyd, Kneedler, & Marshall, 1982; Holman & Baer, 1979; McLaughlin, Burgess, & Sackville-West, 1981) have examined effects of self-recording on academic performance, the present study also examined effects on standardized achievement test

Table 2
Percentage of Correct Movements for Each Student Across Experimental Conditions

		Baseline	Alternating: Prod	Alternating: Attn	Choice	Fade: No tone	Fade: No sheet	Follow-up
Brenda	Mean	64.25	92.26	92.8	93.8	92.3	91	93.25
	SD	35.27	5.6	4.6	3.6	0.57	4.36	2.06
	Median	67	93	94	94	92	89	93
	Range	28–95	73–100	79–97	89–99	92–93	88–96	91–96
Carrie	Mean	75.86	93.83	93.47	92.72	91	92	89
	SD	23.42	6.3	6.38	3.35	1.73	2.65	5.66
	Median	83	95.5	95	93	90	93	89
	Range	36–100	79–100	77–100	88–99	90–93	89–94	85–93
Terry	Mean	87.36	95.4	92.25	92.64	86	—[a]	91.75
	SD	19.13	3.9	6.34	3.53	—[a]	—	3.20
	Median	92	96	93.5	92	—	—	93
	Range	33–100	89–100	79–100	84–97	—	—	87–94
Rich	Mean	74.88	85	83.46	78.75	84.66	89.25	86.5
	SD	26.03	10.84	10.19	7.36	3.79	4.11	0.7
	Median	86	84.5	83	79	83	89.5	86.5
	Range	19–95	68–100	60–98	65–87	82–89	84–94	86–87
Tommy	Mean	68.33	88.33	84.58	89.43	92.5	93.25	89.67
	SD	24.09	7.80	13.96	6.08	7.78	2.99	0.58
	Median	75	90.5	88.5	89	92.5	94	90
	Range	24–94	71–100	50–100	80–94	87–98	89–96	89–90

[a] Terry was present for 1 day only or absent during this condition, prohibiting calculation of some measures.

scores. These changes in achievement, coupled with increases in accuracy (see Table 2) and productivity (Figure 1 and Table 2), are consistent with the interpretation that the self-recording procedures have broad influence on academic performance. Because the results are confounded by increased practice, however, further research is needed to ascertain whether these effects are a function of self-recording alone. Also, our data do not permit us to specify the relative contribution of the two self-recording procedures.

We assessed the fidelity of implementation of the two procedures in three ways: (a) We examined a sample of the pupils' self-recording sheets; the pupils used the appropriate procedure (checked "yes" or "no" under attention recording conditions or wrote a number under productivity recording conditions) 100% of the time during both the attention and productivity conditions. (b) In their judgments of their attention to task, on 98% of the sessions the pupils rated themselves as attending to task 100% of the time; thus, in comparison with the obervers' records, the pupils overestimated their attention to task (see Figure 2). (c) We compared the number of problems the pupils reported that they had completed with the number they actually completed; expressed as a percentage of actual problems completed, the mean number of problems that participants reported they had completed was 105% (range, 93% to 117%), 98% (range, 77% to 107%), 100% (range, 91% to 103%), 99% (range, 95% to 103%), and 97% (range, 83% to 108%) for Brenda, Carrie, Terry, Rich, and Tommy, respectively.

Despite the fact that the students overestimated their attention to task, we still observed reactive effects on their behavior. In contrast, the pupils were accurate (although accuracy was variable) in their recordings of their productivity. Because most factors thought to affect accuracy (see Mace & Kratochwill, 1988) were the same under both self-recording conditions in this study, differences in pupils' accuracy under the two conditions must be attributed primarily to the nature of the recorded behaviors (attention and productivity) or to differences in the self-recording procedures. Of course, specifying which factor or factors account for the results observed in this study will require further research.

When interviewed, all students indicated that they preferred to continue working under the attention-monitoring condition. Four of the 5 students indicated that they felt the productivity-monitoring condition was more time-consuming and often slowed them. Three of the students indicated that they were sometimes confused by the treatments, and 2 of these stated that the productivity-monitoring condition was confusing; the 3rd student did not specify the source of confusion. (Despite these expressions of confusion, as noted previously the pupils reliably implemented the procedures.)

The unanimous preference for the attention condition over the productivity condition contrasts with Harris' (1986) results; the students in her study unanimously preferred the productivity condition. One possible explanation for this difference is that Harris' productivity condition was substantially different from her attention condition—it was done by summation and included a graphing component. In the present study, we kept the two conditions quite similar. Whereas the productivity condition used in the present study may be relatively more intrusive than the attention condition, in the Harris study the reverse appears to be the case. Students may regularly prefer the less intrusive procedure. Another explanation may be that the addition of graphing to Harris' productivity procedure makes it more reinforcing to students. Additional studies are needed to resolve these issues.

Overall, as would be appropriate during independent work, the teacher was not interacting with the pupils. He interacted positively with pupils about 5% of the time during the experimental sessions (6% during baseline; 4% during each alternating treatment condition; and 5% during the choice, withdrawal, and maintenance phases); no negative interactions were observed. These data help to rule out the competing hypothesis that changes in the density or quality of teacher contact with pupils account for the observed changes in performance.

Data from the withdrawal phases replicate previous findings (Hallahan et al., 1979, 1982; Hallahan, Marshall, & Lloyd, 1981) about the fading of self-recording treatments. These data show that students can continue to perform at high levels of productivity and attention to task after the observable components of the treatment have been removed. However, myriad questions about maintenance remain unanswered: For how long do these effects persist? What features of the treatment are critical to the maintenance of effects? Do self-recording of attention and self-recording of productivity contribute differentially to maintenance of effects?

REFERENCES

Cullinan, D., Epstein, M., & Lloyd, J. W. (1983). *Behavior disorders of children and adolescents.* Englewood Cliffs, NJ: Prentice-Hall.

Gardner, W. I., & Cole, C. L. (1988). Self-monitoring procedures. In E. S. Shapiro & T. R. Kratochwill (Eds.), *Behavioral assessment in schools: Conceptual foundations and practical applications* (pp. 206–246). New York: Guilford.

Hallahan, D. P., Kauffman, J. M., & Lloyd, J. W. (1985). *Introduction to learning disabilities* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Hallahan, D. P., Lloyd, J. W., Kneedler, R. D., & Marshall, K. J. (1982). A comparison of the effects of self- versus teacher-assessment of on-task behavior. *Behavior Therapy,* **13,** 715–723.

Hallahan, D. P., Lloyd, J. W., Kosiewicz, M. M., Kauffman, J. M., & Graves, A. W. (1979). Self-monitoring of attention as a treatment for a learning disabled boy's off-task behavior. *Learning Disability Quarterly,* **2**(2), 24–32.

Hallahan, D. P., Marshall, K. J., & Lloyd, J. W. (1981). Self-recording during group instruction: Effects on attention to task. *Learning Disability Quarterly,* **4,** 407–413.

Harris, F. C., & Lahey, B. B. (1978). A method for combining occurrence and nonoccurrence interobserver agreement scores. *Journal of Applied Behavior Analysis,* **11,** 523–527.

Harris, K. (1986). Self-monitoring of attentional behavior versus self-monitoring of productivity: Effects on on-task behavior and academic response rate among learning disabled children. *Journal of Applied Behavior Analysis,* **19,** 417–423.

Holman, J., & Baer, D. M. (1979). Facilitating generalization of on-task behavior through self-monitoring of academic tasks. *Journal of Autism and Developmental Disabilities,* **9**, 429–446.

Hughes, C. A., & Hendrickson, J. M. (1987). Self-monitoring with at-risk students in the regular class setting. *Education and Treatment of Children,* **10**(3), 225–236.

Kazdin, A. E. (1974). Self-monitoring and behavior change. In M. J. Mahoney & C. E. Thoresen (Eds.), *Self-control: Power to the person* (pp. 218–246). Monterey, CA: Brooks/Cole.

Klein, R. D. (1979). Modifying academic performance in the grade school classroom. In M. Hersen, R. M. Eisler, & P. M. Miller (Eds.), *Progress in behavior modification* (Vol. 8, pp. 293–321). New York: Academic Press.

Mace, F. C., & Kratochwill, T. R. (1988). Self-monitoring. In J. C. Witt, S. N. Elliott, & F. M. Gresham (Eds.), *Handbook of behavior therapy in education* (pp. 489–522). New York: Plenum.

McGonigle, J. J., Rohan, J., Dixon, J., & Strain, P. S. (1987). Multiple treatment interference in the alternating treatments design as a function of the intercomponent interval length. *Journal of Applied Behavior Analysis,* **20**, 171–178.

McLaughlin, T. F., Burgess, N., & Sackville-West, L. (1981). Effects of self-recording and self-recording + matching on academic performance. *Child Behavior Therapy,* **3**, 17–27.

Nelson, R. O. (1977). Assessment and therapeutic functions of self-monitoring. In M. Hersen, R. M. Eisler, & P. M. Miller (Eds.), *Progress in behavior modification* (Vol. 5, pp. 263–308). New York: Academic Press.

Rooney, K. J., Polloway, E., & Hallahan, D. P. (1985). The use of self-monitoring procedures with low IQ learning disabled students. *Journal of Learning Disabilities,* **18**, 384–389.

Rusch, F. R., & Kazdin, A. E. (1981). Toward a methodology of withdrawal designs for the assessment of response maintenance. *Journal of Applied Behavior Analysis,* **14**, 131–140.

Smith, D. D., & Lovitt, T. C. (1982). *The computational arithmetic program.* Austin, TX: Pro-Ed.

Snider, V. E. (1987). Use of self-monitoring of attention with LD students: Research and application. *Learning Disability Quarterly,* **10**(2), 139–151.

Thomson, C., Holmberg, M., & Baer, D. M. (1974). A brief report on a comparison of time-sampling procedures. *Journal of Applied Behavior Analysis,* **7**(4), 623–626.

Woodcock, R. W., & Johnson, M. B. (1977). *Woodcock–Johnson psycho-educational battery.* Allen, TX: DLM.

Received June 14, 1988
Initial editorial decision October 19, 1988
Revisions received January 13, 1989; February 6, 1989
Final acceptance March 16, 1989
Action Editor, John M. Parrish